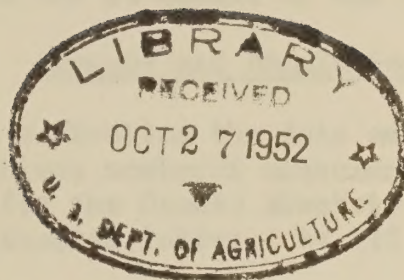
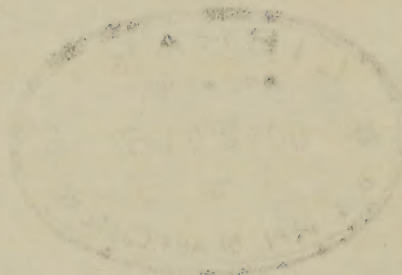


3 POWER REQUIREMENT STUDY,
OCONTO ELECTRIC COOPERATIVE
(WISCONSIN 14 OCONTO)



2 x
U.S. Prepared by
Program Analyst
Office of the Administrator
RURAL ELECTRIFICATION ADMINISTRATION. //
July 1952

FOR THE PURPOSES OF
COURT REPORTING
WISCONSIN



Prepared by
Program Analyst
Office of the Administrator
WISCONSIN RECREATION ADMINISTRATION
July 1962

POWER REQUIREMENT STUDY 1/

WISCONSIN 14 OCONTOForeword

This study has been prepared by the Rural Electrification Administration for use in determining the present and estimated future power requirements of the Oconto Electric Cooperative (Wisconsin 14 Oconto).

The estimates of future loads contained in the study have been arrived at from a field survey in the Cooperative's area and from basic data obtained in the Cooperative's office. The estimates of kwh consumption for farm, nonfarm and town residential consumers used herein are based upon a projection of historical trends in consumption, type of farm, income, competitive sources of energy, and other economic factors which are believed to have a bearing on the future use of electricity in this area.

The estimates of average unit kilowatt demands per consumer at peak load, corresponding to the estimated average kilowatt-hour consumption per member per month of farm, nonfarm and small commercial consumers, have been derived from the curve "Maximum Demand at Substation" accompanying Engineering Memorandum No. 94R5 of the Engineering Division, REA, dated August 21, 1950. The total number of consumers to be served in each substation area, rather than the number of consumers in a particular class, was used as a basis in arriving at the total and unit demands in order to reflect the probable overall diversity between classes of consumers in a given substation area. No adjustment for a power factor less than unity was applied, it being assumed for estimating purposes that the KVA demand as read from the curve was equal to the KW demand at the substation.

Summary and Conclusions

Pertinent information reflecting the data and conclusions arrived at regarding the present and future number of consumers, kilowatt-hour requirements, and kilowatt demands for the Oconto Electric Cooperative (Wisconsin 14 Oconto) are included in the attached Tables I to VII, inclusive.

Table VII (Summary of Power Requirements) indicates that approximately 3,143 consumers will be served by the Cooperative in 1954, 3,298 in 1957, and 3,588 in 1962, at an estimated maximum demand at substation of 3,191 kilowatts in 1954, 4,038 kilowatts in 1957, and 5,456 kilowatts in 1962. Likewise, it is estimated that the Cooperative's annual energy requirements at substations will approximate 11.8 million kilowatt-hours in 1954, 15.2 million kilowatt-hours in 1957, and 20.8 million kilowatt-hours in 1962.

1/ Based on a office study compiled by data received from the Cooperative. Analyzed by K. O. Peters, Office of the Administrator, REA, USDA.

POWER REQUIREMENT STUDY I

WISCONSIN CO-OP

Summary

This study has been prepared by the Rural Electrification Administration for use in determining the present and estimated future power requirements of the Wisconsin Electric Cooperative (Wisconsin Co-Op).

The estimates of future loads contained in the study have been arrived at from a field survey in the cooperative's area and from data obtained in the cooperative's office. The estimates of the consumption for farm, commercial and town residential consumers used herein are based upon a projection of historical trends in consumption, type of farm, income, competitive sources of energy, and other economic factors which are believed to have a bearing on the future use of electricity in this area.

The estimates of average unit kilowatt demand per consumer at peak load, corresponding to the estimated average kilowatt-hour consumption per consumer per month of farm, commercial and small residential consumers, have been derived from the curve "Minimum Demand of Residential Consumers" in the Wisconsin No. 10 of the Engineering Division, R.E.A. dated August 21, 1930. The total number of consumers to be served in each substation area, rather than the number of consumers in a particular class, was used as a basis in arriving at the total unit demand in order to reflect the probable overall diversity between classes of consumers in a given substation area. No adjustment for a power factor less than unity was applied, it being assumed for estimating purposes that the kW demand as read from the curve was equal to the kW demand at the substation.

Summary and Conclusions

Extensive information reflecting the data and conclusions arrived at regarding the present and future power requirements, kilowatt-hour requirements, and kilowatt demand for the Wisconsin Electric Cooperative (Wisconsin Co-Op) are included in the attached Tables I to VII, inclusive.

Table VII (Summary of Power Requirements) indicates that approximately 2,145 consumers will be served by the cooperative in 1934, 2,325 in 1937, and 2,588 in 1939, at an estimated maximum demand at substation of 2,101 kilowatts in 1934, 2,038 kilowatts in 1937, and 2,458 kilowatts in 1939. It is estimated that the cooperative's annual energy requirements at substation will approximate 11.5 million kilowatt-hours in 1934, 12.3 million kilowatt-hours in 1937, and 30.8 million kilowatt-hours in 1939.

Based on a study compiled by data received from the cooperative, analyzed by R. O. Peters, Office of the Administrator, R.E.A., USA.

The degree of attainment of area coverage by the Cooperative, as well as the achievement of the estimated kilowatt-hour consumption foreseen in this report, are contingent on the following important considerations:

1. An adequate, dependable source of low-cost power supply.
2. Dependable, adequate electrical power to the ultimate consumer with a minimum of interruption in service and at the lowest retail rate commensurate with "pay out" considerations.
3. A fully prosecuted power use program designed to attain the goals of saturation of appliances and farm equipment reflected by the estimates included in this report.

✓
E. C. Weitzell,
Program Analyst

The factors of attainment of these objectives, as well as the achievement of the estimated kilowatt-hour generation program in this report, are contingent on the following important considerations:

1. An adequate, dependable source of low-cost power supply.

2. Dependable, adequate electrical power to the ultimate consumer with a minimum of interruption in service and at the lowest repair rate commensurate with "pay out" considerations.

3. A fully programmed power use program designed to attain the goals of conservation of appliances and farm equipment reflected by the estimates included in this report.

E. C. Whitwell,
Program Analyst

TABLE 1

COMPARATIVE ANNUAL OPERATING DATA ON CONSUMERS AND AVERAGE MONTHLY CONSUMPTION

WISCONSIN 14 OCONTO														(CONT'D.)	
YEAR	FARM			NONFARM RESIDENTIAL			SMALL COMMERCIAL			UTILITIES		TOWN RESIDENTIAL		LARGE COMMERCIAL	
	MEMBERS NO.	AVERAGE KWH/MO. \$ INCR.		MEMBERS NO.	AVERAGE KWH/MO. \$ INCR.		MEMBERS NO.	AVERAGE KWH/MO. \$ INCR.		MEMBERS NO.	AV. KWH/MO.	MEMBERS NO.	AVERAGE KWH/MO. \$ INCR.	MEMBERS NO.	AVERAGE KWH/MO. \$ INCR.
1941	804	60	--	106	44	--	123	153	--						
1942	954	68	13.3	134	48	9.1	124	150	-2.0						
1943	1,028	78	14.7	119	49	2.1	66	258	72.0						
1944	1,165	24	7.7	128	51	4.1	66	258	-0.0						
1945	1,402	91	8.3	148	60	17.6	119	173	-32.9						
1946	1,580	110	20.9	156	45	-25.0	125	212	22.5						
1947	1,756	134	21.8	165	30	-33.3	130	279	31.6	20	120	--			
1948	1,876	151	12.7	172	40	33.3	138	301	7.9	20	144	20.0			
1949	1,950	181	19.9	174	44	10.0	144	303	0.7	24	135	-6.2			
1950	2,052	202	11.6	87	23	-47.7	140	328	8.3	26	150	11.1	5	317	--
1951	2,101	229	13.4	74	23	-0.0	78	518	57.9	1	71,200	176	17.3	7	700 120.8
1952*	2,107	269	--	66	21	--	76	502	--	1	30,720	175	--	8	3,393 --
SUM OF YEARLY \$ INCR.															
(1941 - 1951)															
AVERAGE PER YEAR															
144.3															
14.4															
166.0															
16.6															
42.2															
10.5															
120.8															
120.8															

* FIVE MONTHS TO MAY 31, 1952

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

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TABLE 1 (CONT'D.)

COMPARATIVE ANNUAL OPERATING DATA ON CONSUMERS AND AVERAGE MONTHLY CONSUMPTION

WISCONSIN 14 OCONTO												
YEAR	SEASONAL		STREET LIGHTING		OTHER		PUB. BLDGS.		TOTAL		MEMBERS	AVERAGE
	MEMBERS	AVERAGE	MEMBERS	AVERAGE	MEMBERS	AVERAGE	MEMBERS	AVERAGE	MEMBERS	AVERAGE		
	NO.	KWH/MO. % INCR.	NO.	KWH/MO. % INCR.	NO.	KWH/MO. % INCR.	NO.	KWH/MO. % INCR.	NO.	KWH/MO. % INCR.	NO.	KWH/MO. % INCR.
1941									1,033	69	—	—
1942									1,213	74	7.2	7.2
1943					55	21	—	—	1,267	82	10.8	10.8
1944					57	25	19.0	19.0	1,416	87	6.1	6.1
1945			2	34	—	—	—	—	1,671	94	8.0	8.0
1946			2	37	8.8	8.8	—	—	1,863	112	19.1	19.1
1947			2	39	5.4	5.4	—	—	2,069	135	20.5	20.5
1948			2	33	-18.2	-18.2	—	—	2,210	151	11.9	11.9
1949			2	31	-6.1	-6.1	—	—	2,294	178	17.9	17.9
1950	192	59	3	45	45.2	45.2	118	50	2,430	195	9.6	9.6
1951	206	49	3	40	-11.1	-11.1	—	—	2,471	242	24.1	24.1
1952 *	—	—	3	42	—	—	67	73	2,410	281	—	—
SUM OF YEARLY % INCR.												
(1941 - 1951)												
AVERAGE PER YEAR												
119.0												
59.9												
135.2												
13.5												

* FIVE MONTHS TO MAY 31, 1952.

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

TABLE II

COMPARATIVE ANNUAL OPERATING DATA ON ENERGY REQUIREMENTS

YEAR	ENERGY PURCHASED		ENERGY SOLD		% INCR.	ENERGY LOSSES		MAXIMUM KW DEMAND	TOTAL SERVICES CONNECTED	TOTAL MILES ENERGIZED	OVERALL CONSUMER DENSITY	AVERAGE COST PER KWH
	KWH	% INCR.	KWH	% INCR.		KWH	% LOSS					
1941	1,072,280	---	857,831	---	---	214,449	20.0	434	1,089	425	2.40	\$.01211
1942	1,360,800	26.9	1,083,913	26.4	26.4	276,887	20.3	499	1,207	435	2.77	.01164
1943	1,564,000	14.9	1,248,980	15.2	15.2	315,020	20.1	576	1,404	442	3.18	.01143
1944	1,810,400	15.8	1,478,621	18.4	18.4	331,779	18.3	730	1,618	480	3.37	.01121
1945	2,330,400	28.7	1,876,226	26.9	26.9	454,174	19.5	941	1,865	528	3.53	.01091
1946	3,043,600	30.6	2,495,321	33.0	33.0	548,279	18.0	*	2,087	571	3.65	.01068
1947	3,865,800	27.0	3,170,510	27.1	27.1	695,290	18.0	*	2,284	600	3.81	.01140
1948	4,959,000	28.3	4,012,545	26.6	26.6	946,455	19.1	1,987	2,311	630	3.67	.01281
1949 ***	6,139,500	23.8	4,891,168	21.9	21.9	1,248,332	20.3	*	2,438	666	3.66	.00967
1950	7,273,114	18.5	5,677,921	16.1	16.1	1,595,193	21.9	2,498	2,532	698	3.63	.00740
1951	8,624,300	18.6	7,159,178	26.1	26.1	1,465,122	17.0	2,872	2,584	706	3.66	.00633
1952 **	3,920,900	---	3,381,334	---	---	539,566	13.8	---	2,616	717	3.65	.00518
SUM OF YEARLY %INCR. (1941 - 1951)												
AVERAGE PER YEAR												
23.1												
23.8												
18.8												

* NOT AVAILABLE.

** FIVE MONTHS ENDING MAY 31, 1952.

*** HYDRO PLANT PLACED IN OPERATION (1000KW).

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

TABLE III

ESTIMATE OF LOADS - OCONTO FALLS AND STILES HYDRO PLANT SUBSTATION AREA

WISCONSIN 14 OCONTO	TYPE OF CONSUMER	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
		1954	1957	1962	1954	1957	1962	1954	1957	1962
FARM		1,280	1,298	1,326	@1.113	@1.368	@1.791	@3600	@4500	@6000
					1,425	1,776	2,375	4,608,000	5,841,000	7,956,000
NONFARM (RES.)		82	89	113	@0.155	@0.165	@0.265	@300	@420	@720
					13	15	30	21,600	37,380	81,360
SMALL COMMERCIAL		50	58	59	@2.045	@2.232	@2.554	@6900	@7560	@8700
					102	129	151	345,000	438,480	513,300
PUBLIC BUILDINGS		41	42	43	@0.286	@0.350	@0.436	@780	@960	@1200
					12	15	19	31,980	40,320	51,600
TOWN (RES.)		38	42	64	@0.893	@1.079	@1.249	@2820	@3480	@4080
					34	45	80	107,160	146,160	261,120
SEASONAL		180	193	223	@0.307	@0.393	@0.503	@840	@1080	@1440
					55	76	112	151,200	208,440	321,120
STREET LIGHTING		5	5	5	@.25/1.1DF	@.25/1.1DF	@.25/1.1DF	@600	@600	@600
					1	1	1	3,000	3,000	3,000
LARGE COMMERCIAL:					@37.5/1.5DF	@37.5/1.5DF	@37.5/1.5DF			
THOME DAIRY PLANT		1	1	1	25	25	25	40,000	42,000	50,000
					@18/1.2DF	@18/1.2DF	@18/1.2DF			
ALAMO SUPPER CLUB		1	1	1	15	15	15	35,000	35,000	35,000
					@15/1.5DF	@15/1.5DF	@15/1.5DF			
SCHROEDER FLORAL CO.		1	1	1	10	10	10	20,000	20,000	20,000
SUB-TOTAL		1,679	1,730	1,836	1,692	2,107	2,818	5,362,940	6,811,780	9,292,500

NOTE: CONTINUED ON NEXT PAGE.

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

TABLE III (CONT'D.)

ESTIMATE OF LOADS - OCONTO FALLS AND STILES HYDRO PLANT SUBSTATION AREA

WISCONSIN 14 OCONTO	TYPE OF CONSUMER	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
		1954	1957	1962	1954	1957	1962	1954	1957	1962
	BROUGHT FORWARD	1,679	1,730	1,836		2,107	2,818	5,362,940	6,811,780	9,292,500
	LARGE COMMERCIAL (CONT'D.)									
	ORNAMENTAL IRON & WELDING SHOP	1	1	1	@10/2.0DF	@10/2.0DF	@10/2.0DF	5,000	5,000	5,000
	BARCOME TAVERN	1	1	1	@10/1.2DF	@10/1.2DF	@10/1.2DF	12,000	12,000	12,000
	BIERSTEKER TAVERN	1	1	1	@12/1.2DF	@12/1.2DF	@12/1.2DF	20,000	20,000	20,000
	REGAL FUR FARM	1	1	1	@40/2.0DF	@40/2.0DF	@40/2.0DF	32,000	32,000	32,000
	MURPHY FROZEN FOOD LOCKER	1	1	1	@15/1.5DF	@15/1.5DF	@15/1.5DF	15,000	15,000	15,000
	LARGE COMMERCIAL (POTENTIAL)	--	3	5	@15/1.5DF	@15/1.5DF	@15/1.5DF	--	45,000	75,000
	SUB-TOTAL							5,446,940	6,940,780	9,451,500
	PLUS DIST. LOSSES (APPROX.)							@18% 1,196,060	@18% 1,523,220	@17% 1,935,500
	TOTAL	1,684	1,738	1,846	1,745	2,190	2,921	6,643,000	8,464,000	11,387,000

ANNUAL LOAD FACTOR -

43.5%

44.1%

44.5%

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

TABLE IV

ESTIMATE OF LOADS - COLEMAN SUBSTATION AREA

WISCONSIN 14 OCONTO									
TYPE OF CONSUMER	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
	1954	1957	1962	1954	1957	1962	1954	1957	1962
FARM	600	617	641	@1.136	@1.395	@1.828	@3600	@4500	@6000
NONFARM (RES.)	40	44	60	@0.155	@0.169	@0.270	@300	@420	@720
SMALL COMMERCIAL	26	32	35	@2.087	@2.277	@2.606	@6900	@7560	@8700
PUBLIC BUILDINGS	14	15	16	@0.292	@0.357	@0.445	@780	@960	@1200
TOWN (RES.)	22	28	36	@0.912	@1.101	@1.274	@2820	@3480	@4080
SEASONAL	210	240	284	@0.314	@0.401	@0.514	@840	@1080	@1440
STREET LIGHTING	2	2	2	@.25/1.1DF	@.25/1.1DF	@.25/1.1DF	@600	@600	@600
LARGE COMMERCIAL:									
RUDOLPH DAIRY PLANT	1	1	1	@15/1.5DF	@15/1.5DF	@15/1.5DF	15,000	18,000	20,000
GRAETZ MACHINE SHOP	1	1	1	@50/2.0DF	@50/2.0DF	@50/2.0DF	45,000	45,000	45,000
JOHNSON FROZEN FOOD	1	1	1	@25/1.5DF	@25/1.5DF	@25/1.5DF	25,000	25,000	25,000
LOCKER PLANT	1	1	1	@12/1.2DF	@12/1.2DF	@12/1.2DF	18,000	18,000	18,000
TAVERN (LLOLYD KALBES)	1	1	1	@15/1.5DF	@15/1.5DF	@15/1.5DF	15,000	30,000	45,000
LARGE COMMERCIAL (POTENTIAL)	1	2	3						
SUB-TOTAL									
PLUS DIST. LOSSES (APPROX.)							2,719,560	3,545,140	4,922,940
TOTAL	919	984	1,081	905	1,156	1,571	@18%	@18%	@17%
							597,440	777,860	1,008,060
							3,317,000	4,323,000	5,931,000

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

TABLE V

ESTIMATE OF LOADS - UNDERHILL SUBSTATION AREA

WISCONSIN 14 OCONTO										
TYPE OF CONSUMER	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS			
	1954	1957	1962	1954	1957	1962	1954	1957	1962	
FARM	320	330	348	@1.182	@1.424	@1.865	@3600	@4500	@6000	
				378	470	649	1,152,000	1,485,000	2,088,000	
NONFARM (RES.)	46	50	65	@0.160	@0.175	@0.276	@300	@420	@720	
				7	9	18	13,800	21,000	46,800	
SMALL COMMERCIAL	24	29	31	@2.173	@2.324	@2.659	@6900	@7560	@8700	
				52	67	82	165,600	219,240	269,700	
PUBLIC BUILDINGS	12	13	14	@0.304	@0.365	@0.454	@780	@960	@1200	
				4	5	6	9,360	12,480	16,800	
TOWN (RES.)	21	25	43	@0.949	@1.124	@1.300	@2820	@3480	@4080	
				20	28	56	59,220	87,000	175,440	
SEASONAL	110	120	150	@0.327	@0.409	@0.524	@840	@1080	@1440	
				36	49	79	92,400	129,600	216,000	
STREET LIGHTING	3	3	3	@.25/1.1DF	@.25/1.1DF	@.25/1.1DF	1,800	1,800	1,800	
LARGE COMMERCIAL:										
CHAMBERS SUPPER CLUB	1	1	1	@15/1.2DF	@15/1.2DF	@15/1.2DF	25,000	25,000	25,000	
				13	13	13				
LARGE COMMERCIAL (POTENTIAL)	3	5	6	@15/1.5DF	@15/1.5DF	@15/1.5DF	45,000	75,000	90,000	
				30	50	60				
SUB-TOTAL										
							1,564,180	2,056,120	2,929,540	
PLUS DIST. LOSSES (APPROX.)							@18%	@18%	@17%	
							343,820	450,880	600,460	
TOTAL	540	576	661	541	692	964	1,908,000	2,507,000	3,530,000	

ANNUAL LOAD FACTOR - 40.3% 41.4% 41.8%

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

TABLE VI

ESTIMATE OF LOADS - SUMMARY OF POWER REQUIREMENTS
(BY CLASSIFICATION OF CONSUMERS)

WISCONSIN 14 OCONTO	TYPE OF CONSUMER	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
		1954	1957	1962	1954	1957	1962	1954	1957	1962
	FARM	2,200	2,245	2,315	2,485	3,107	4,196	7,920,000	10,102,500	13,890,000
	NONFARM (RES.)	168	183	238	26	31	64	47,400	76,860	171,360
	SMALL COMMERCIAL	100	119	125	208	269	324	689,600	899,640	1,087,500
	PUBLIC BUILDINGS	67	70	73	20	25	32	52,260	67,200	87,600
	TOWNS (RES.)	81	95	143	74	104	182	228,420	330,600	583,440
	SEASONAL	500	553	657	157	221	337	420,000	597,240	946,080
	STREET LIGHTING	10	10	10	3	3	3	6,000	6,000	6,000
	LARGE COMMERCIAL (EXISTING)	13	13	13	178	178	178	307,000	312,000	322,000
	LARGE COMMERCIAL (POTENTIAL)	4	10	14	40	100	140	60,000	150,000	210,000
	SUB-TOTAL							9,730,680	12,542,040	17,303,980
	PLUS DIST. LOSSES (APPROX.)							2,137,320	2,751,960	3,546,020
	TOTAL	3,143	3,298	3,588	3,191	4,038	5,456	11,868,000	15,294,000	20,848,000

TABLE VII

**ESTIMATE OF LOADS - SUMMARY OF POWER REQUIREMENTS
(BY SUBSTATIONS)**

WISCONSIN 14 OCONTO	NUMBER OF CONSUMERS			KW DEMAND			ANNUAL KWH REQUIREMENTS		
	1954	1957	1962	1954	1957	1962	1954	1957	1962
SUBSTATION AREAS									
OCONTO FALLS AND									
STILES HYDRO PLANT	1,684	1,738	1,846	1,745	2,190	2,921	6,643,000	8,464,000	11,387,000
COLEMAN	919	984	1,081	905	1,156	1,571	3,317,000	4,323,000	5,931,000
UNDERHILL	540	576	661	541	692	964	1,908,000	2,507,000	3,530,000
TOTAL	3,143	3,298	3,588	3,191	4,038	5,456	11,868,000	15,294,000	20,848,000

ANNUAL LOAD FACTOR - 42.4% 43.2% 43.6%

PROGRAM ANALYST, OFFICE OF THE
ADMINISTRATOR, REA - JULY 1952

